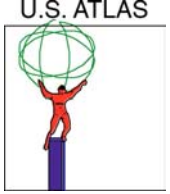
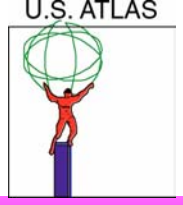


3.6 Trigger DAQ Maintenance and Operations

Robert Blair

Argonne National Lab.

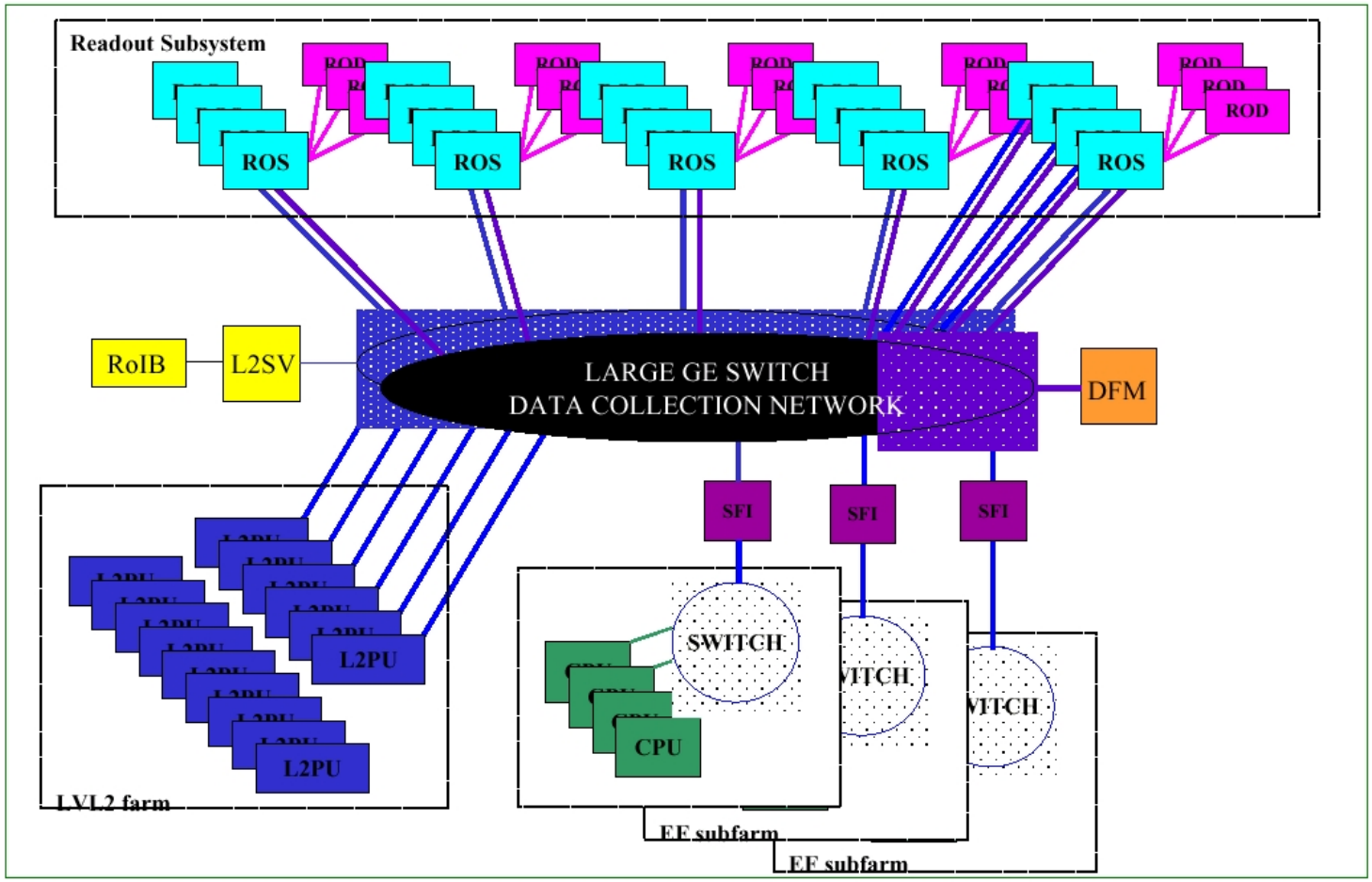


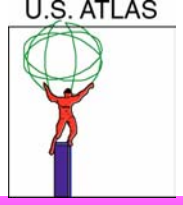
Outline

- TDAQ organization and overview
- US TDAQ expected deliverables & schedule
- Status of construction: prototyping, plans for better defining deliverables
- Schematic schedule showing current view of construction, pre-operations, operations and maintenance
- U.S. responsibilities in M&O
  - Technical, cost and schedule definition
    - How the estimates were made
      - U.S. Share of total ATLAS M&O
      - Staffing and schedule
- Conclusions

System Overview

An Example HLT/DAQ Implementation with Separate LVL2 and EF Networks





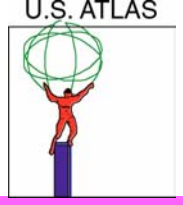
U.S. Institutions

- Argonne National Lab.
- Michigan State University
- University of California Irvine
- Wisconsin

Trigger DAQ (TDAQ) composed of

- Supervisor RoI Builder (SRB)
- Level 2 Processors and network
- Readout system (ROS)
- Event Filter and network (EF)

U.S. deliverables are 100% of SRB
U.S. deliverables are 32% of total Level 2
U.S. deliverables are 0% of total ROS
U.S. deliverables are 0% of total EF



Status

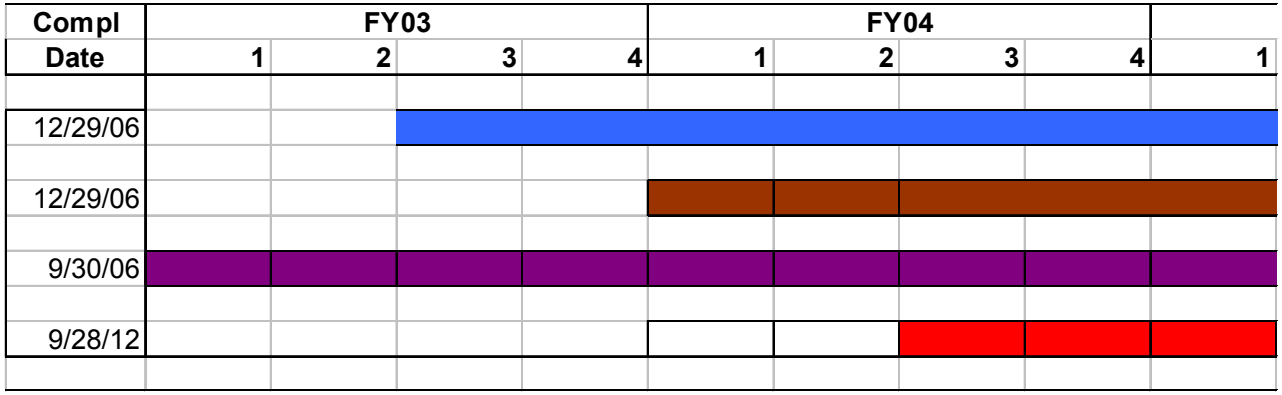
- TDAQ is currently in R&D/Design phase
  - Software framework for data movement and algorithms under test
  - Testbed runs beginning for benchmarking
  - Algorithms and algorithm framework will undergo revisions up to turn on
- TDAQ design review in July
- TDAQ *Technical Design Report* will be prepared for LHCC by end ’02
- US baselining at end ’02/beginning ‘03

U.S. ATLAS

Example of Current Work

- Produced piece of RoI Builder (Gigabit Ethernet based S-link source card)
- Currently assisting Tilecal group in adapting it for testbeam readout use

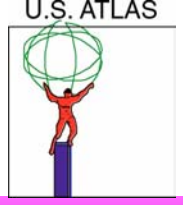
Schedule



Pre-operations includes test beam support of TDAQ

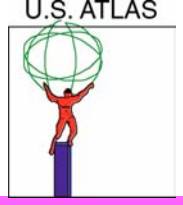
Operations includes support of some core infrastructure for ATLAS experiment (SRB, software, network)

Operations spending flat plus bump for rapid reaction at turn on (spring '07). Pre-operations small in '05 – no testbeam then



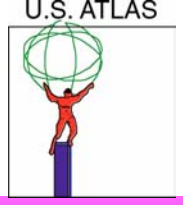
TDAQ System

- Supervisor RoI Builder (M&O 3.6.2.1 & 3.6.2.4)
  - 100% US responsibility (ANL & MSU)
    - Consists of farm type processors (~10) with some specialized hardware (Slink receivers dedicated Gigabit ethernet TBD)
    - RoI Builder which is several VME 9U boards
    - VME crate with a controller
- Primary M&O responsibilities
  - Spares
  - Software support (upgrades and bug fixes)
    - Constant effort of ~.5 Computer Prof.
  - Electronics operations ~.5 EE



Level 2 System

- Level 2 (M&O 3.6.2.3, 3.6.2.2 & 3.6.3)
  - 32% US responsibility (ANL , MSU, UCI & UW)
    - ▲Consists of farm type processors (~1000), network interfaces, network switches, software
- Primary M&O responsibilities
  - Spares
  - Software support (upgrades and bug fixes)
    - ▲Constant effort at level of 2.0 (.5/institution) Computer Prof. and 4 Postdocs
  - Rolling replacement (CPUs on a 4 year cycle Network on 10-13 year cycle)
- Hardware and System Management (not software support) are Common Costs (3.6.3)
  - Atlas wide decision to consider this as Category A M&O



U.S. ATLAS M&O Estimate
Trigger/DAQ WBS Level 4 Profile

Funding Source: All | Funding Type: Program | 4/3/02 8:29:15 AM

Institutions: All | Labor/Material: Both

WBS Number	Description	FY 03 (k$)	FY 04 (k$)	FY 05 (k$)	FY 06 (k$)	FY 07 (k$)	FY 08 (k$)	FY 09 (k$)	FY 10 (k$)	FY 11 (k$)	FY 12 (k$)
3	U.S. ATLAS M&O Estimate	18	129	61	785	978	704	525	525	525	525
3.6	Trigger/DAQ	18	129	61	785	978	704	525	525	525	525
3.6.1	Pre Operations	18	93	0	81	0	0	0	0	0	0
3.6.1.1		0	0	0	0	0	0	0	0	0	0
3.6.1.2	Communications and Travel	6	16	0	16	0	0	0	0	0	0
3.6.1.3	Programming Support	0	65	0	65	0	0	0	0	0	0
3.6.1.4	Equipment	12	12	0	0	0	0	0	0	0	0
3.6.2	Operations	0	36	61	704	978	704	525	525	525	525
3.6.2.1	Supervisor RoI Builder	0	36	40	177	210	177	145	145	145	145
3.6.2.2	Communications and Travel	0	0	0	47	142	47	47	47	47	47
3.6.2.3	Programming Support	0	0	0	458	605	458	311	311	311	311
3.6.2.4	Test facilities	0	0	21	21	21	21	21	21	21	21
3.6.3	CERN Common Costs	0	0	0	0	0	0	0	0	0	0

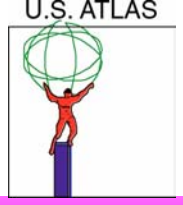
Labor (M&O) Summary FTEs by FY Research Program

MANPOWER ESTIMATE SUMMARY IN FTEs

WBSNo: 3.6 | Funding Type: Program | 4/3/02 10:28:59 AM

Description: Trigger/DAQ | Institutions: All | Funding Source : All

	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	Calculated Total	Entered Total
Faculty											.0	.5
Sr Research Scientist											.0	.0
Term Scientist											.0	.0
Post Doc											.0	.0
Grad Student											.0	.0
Mechanical Engineer											.0	.0
Electrical Engineer		.3	.1	1.5	1.5	1.3	1.0	1.0	1.0	1.0	8.7	.0
Technicial											.0	.0
Computer Profession		.3	.1	3.2	4.0	3.0	2.0	2.0	2.0	2.0	18.7	.0
Designer											.0	.0
Adminsitrator											.0	.0
Contract Labor											.0	.0
TOTAL LABOR	.0	.7	.2	4.7	5.5	4.3	3.0	3.0	3.0	3.0	27.3	.5



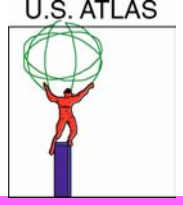
Labor Summary FTEs by FY Base/Infrastructure

MANPOWER ESTIMATE SUMMARY IN FTEs

WBSNo: 3.5 | Funding Type: Base+Infrastructure | 4/3/02 10:31:38 AM

Description: ATLAS Endcap Muon M&O | Institutions: All | Funding Source : All

	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	Calculated Total	Entered Total
Faculty	.1	.4	.4	.4	.5	.2	.2	.2	.2	.2	2.6	.0
Sr Research Scientist	.3	.6	.7	1.3	1.3	.6	.4	.4	.4	.4	6.3	.0
Term Scientist											.0	.0
Post Doc	.3	1.1	4.0	7.0	9.0	2.6	.8	.8	.8	.8	27.3	.0
Grad Student		3.0	8.0	12.0	15.0	6.6	2.1	1.2	1.2	1.2	50.4	.0
Mechanical Engineer											.0	.0
Electrical Engineer											.0	.0
Technicial											.0	.0
Computer Profession											.0	.0
Designer											.0	.0
Adminsitrator											.0	.0
Contract Labor											.0	.0
TOTAL LABOR	.7	5.1	13.0	20.6	25.7	10.0	3.6	2.7	2.7	2.7	86.6	.0



Conclusions

- Most operations costs come under ATLAS Category A M&O
- Manpower and specific US responsibilities are detailed only
- Two areas
  - Support of experiment Trigger and Readout
  - Early support of test beam activities